REMARKS

With the entry of this Amendment, claims 29-41, 43-54 and 59-60 are pending in the application. Claims 42, 57 and 58 have been cancelled without prejudice.

Turning to the claim amendments, the claims have been amended to place them in more conventional U.S. patent claim format and to further distinguish the claimed invention.

Claim 29 has been amended to include the following additional features:

a) the micro-structure is made of a "first" material Au,

b) the emitter body F extends between two electrodes H,

c) the electrodes H are made of a "second" material having a high melting point,

d) a "coating layer" OR formed by the claimed oxide is present in the structure,

e) at least one of the emitter body F, the electrodes H and the coating layer OR includes one throat or cavity G being open on the first material Au for receiving part of said first material Au in case of melting thereof.

These features are supported by the specification, e.g., figures 6-15, page 16, lines 30-33, figure 11 (cavity in the electrodes H), figure 12 (cavity in the coating layer OR), figure 14 (cavity in the emitter body F, formed by the first layer W and the second layer Au), and corresponding parts of the description.

Claim 30 has been amended to recite that the throat or cavity G is defined in at least one of the electrode G, at an interface region thereof between the first

material Au and the second material. These features are supported by the specification, e.g., figure 11 and corresponding parts of the description.

Claim 31 has been amended to be consistent with amended claim 30.

Claim 32 has been amended to recite that the throat or cavity (G) is defined in the first layer OR, at an interface region thereof between the first material Au and the oxide of the oxide layer OR. These features are supported by the specification, e.g., figure 12 and corresponding parts of the description.

Claim 33 has been amended to be consistent with amended claim 29.

Claim 34 has been amended to be consistent with amended claim 29, with the additional limitation that the throat or cavity G is defined in the first layer, at an interface region between a conductor material W forming the first layer and the first material Au of the second layer. These features are supported by the specification, e.g., figure 14 and corresponding parts of the description.

Claims 35-41 have been amended to be consistent with amended claim 29.

Claim 51 has been amended to include the same limitations as amended claim 29, in the form of method steps. Wording similar to the wording of claim 53 has been used for this purpose.

Claim 52 has been amended to include the same limitations as amended claim 30, in the form of method steps.

Claim 53 has been amended to include the same limitations as amended claim 32, in the form of method steps.

Claim 59 is a new claim including the same limitations as amended claim 34, in the form of method steps.

Claim 60 is a new claim that includes the subject matter of previously submitted claim 29.

No new matter has been added by way of the claim amendments.

Claim Rejections under 35 USC § 103

The following obviousness rejections have been lodged against the claims:

1. Claims 29-41, 43-46, 48-50, 53-54 and 57 stand rejected as allegedly being obvious over Levinson (USP 5,152,870) in view of Fleming (USP 6,768,256) and further in view of Richard (GB 2032173).

2. Claim 47 stands rejected as allegedly being obvious over Levinson in view of Fleming and Richard and further in view of Gee (US Patent Application Publication No. 20030132705).

3. Claims 51-52 stand rejected as allegedly being obvious over Levinson, Fleming and Richard and further in view of Fujishima (U.S. Published Patent Application No. 20020096107).

4. Claims 42 and 58 stand rejected as allegedly being obvious over Levinson, Fleming and Richard and further in view of Tanaka (USP 6,281,629).

In essence, the Examiner has replaced the McMaster reference as cited in the first Office Action with the Fleming reference cited in the pending Office Action. Although applicant thanks the Examiner for withdrawing all of the previous rejections based upon McMaster, applicant now requests that the Examiner withdraw the new rejections for at least the following reasons.

Respectfully stated, one skilled in the art would not combine the teachings of Levinson, Fleming and Richard and arrive at the claimed invention. As explained in the specification and as required by the claimed invention, specific materials having advantageous emissive properties are used for forming a nano-structure of the emitter, such as gold, silver, copper (see, e.g., paragraph bridging

pages 14 and 15 of the specification). Additionally, in order to obtain an advantageous black body emission (i.e., one with a greater visible emission), the body must be taken to the highest possible temperatures (maximum efficiency above 5000K).

Fleming teaches one skilled in the art in an opposite direction. In the solution of Fleming, improvement in light emission is primarily obtained by shaping the emitter as a photonic crystal (particularly, having the Lincoln-log structure as depicted at figure 1), because this structure allows one to obtain a narrow-band light emission. This is immediately apparent from a correct reading of the entire disclosure of Fleming.

Fleming also states that alternative material can be used, instead of tungsten, for forming the emitter, including gold, silver and copper. However, at column 13, lines 31-34, Fleming specifically states that because "*the input power is efficiently channelled into the narrow-band light emission, the photonic crystal light source can be operated at lower temperatures compared to blackbody radiators*" (emphasis added).

This aim of Fleming is in stark contrast to the claimed invention, according to which the emitter must be taken to the highest possible temperature, to improve emission.

As a result, one skilled in the art would have no motivation to combine Levinson, Fleming and Richard in order to arrive at the claimed invention. Only with improper hindsight would a person of skill in the art run contrary to the teachings of Fleming and somehow combine the cited references in an effort to

arrive at the claimed invention.

Moreover, claims 29, 30, 32, 34 (device) and claims 51, 52, 53, 59 (method) now include limitations similar to those which were in cancelled claims 42 and 58. The concept underlying independent claims 29 and 51 is that the nano-structure is formed of a material which melts when the emitter is operated at the respective operating temperature, and that a cavity is provided to receive part of this material, when it melts. Similar inventive concepts were in claims 42 and 58.

Claims 42 and 58 have been rejected as allegedly being obvious over Levinson, in view of Fleming and Richard and in further view of Tanaka. Respectfully stated, this rejection of claims 42 and 58 is pure hindsight. As acknowledged by the Examiner to date, Tanaka simply teaches an electrode support held in a generic gap. This has nothing to share with the claimed invention of providing a cavity open on a material forming at least part of an emitter body which is brought to incandescence.

In contrast to the claimed invention, the structure of the short arc lamp of Tanaka (see figures 1-4) includes an electrode support component 5 and a feed component 4. A groove-shaped gap 41 is formed in the feed component 4. Then, one end 5b of the support component 5 is installed loosely in the gap 41, i.e., with a small clearance. When the support component 5 expands due to heat, end 5b thereof can move in the gap 41 in the radial direction.

Furthermore, when Tanaka's arc lamp is operated, the anode 22 and cathode 21 reach a high temperature. The electrode support component 5 reaches a high temperature and expands due to heat, i.e., not the electrodes. When the

lamp is turned off, the support component 5, which has expanded due to heat, is returned to the original length. Since an end 5b of the support component 5 is held in the gap 41, it can move in the radial direction, to absorb thermal expansion and contraction.

Thus, Tanaka – aside from dealing with a different type of light emitter - refers neither to an emitter body, nor to the electrodes thereof. As taught to one skilled in the art, it deals with a support member of one of the electrodes and with a feed element thereof, which feed element has a gap. The feed element 4 (or even the electrode support 4) of Tanaka is not brought to incandescence and does not emit any light. These features are quite different than the claimed invention.

Fairly stated, there is no reasonable motivation to combine the very specific teachings of Tanaka with those of the other three references to attain the now claimed subject matter. Not even an improper hindsight reconstruction of the cited references would lead one skilled in the art to the claimed invention.

Amended claims 30, 32, 34 (device) and claims 52, 53, 59 (method) include the further limitation that the throat or cavity is formed at an interface region between the material forming the micro-structure of the emitter and the material of the electrodes, or of the oxide layer, or in one layer forming part the emitter body. There is no teaching or suggestion of this feature in Tanaka (which, again, concerns a gap in a feed element of an electrode).

Finally, applicant notes that the European Patent Office has granted a patent for the applicant's invention. See, e.g., EP 1599892 B1. For the reasons set forth above and below, and in line with the granted European patent, applicant

submits that new claim 60 is patentable.

Claim 60 relates to an incandescence emitter. Incandescence is emission of visible electromagnetic radiation from a body due to its temperature. Incandescence occurs in light sources because the filament material resists the flow of electrons, i.e., the filament is heated to incandescence due to the electric resistance of the used material. The claimed invention is based on a completely different approach than anything disclosed in the prior art. As noted above, low-melting point materials are used in the invention, such as gold, silver and copper, because the inventors discovered that these materials have emitting properties (i.e., optical constants) that are more advantageous than tungsten. As explained in the specification, the inventors discovered that, in order to obtain from these materials the most advantageous emission, the emitter has to be brought to the highest temperature possible, and this entails the possibility that the material melts. For this reason, according to the claimed invention, the emitter is coated with the refractory oxide, which is configured to preserve the surface nanostructure. The cited references neither disclose nor suggest these features or their objectives.

For at least the foregoing reasons, applicant submits that the subject application is in condition for allowance and earnestly solicits a notice to that effect.

If the Examiner has any questions concerning this application, the undersigned may be contacted at 703-816-4009.

Respectfully submitted,

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